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(54) **SYSTEMS AND METHODS FOR A SECURE SHIPPING LABEL**

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G08B 21/00 (2006.01)
G06Q 10/08 (2012.01)

(52) **U.S. Cl.**
CPC ***G06Q 10/08*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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2005/0097066	A1 *	5/2005	Nambudiri	705/401
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Assistant Examiner — Brian Wilson
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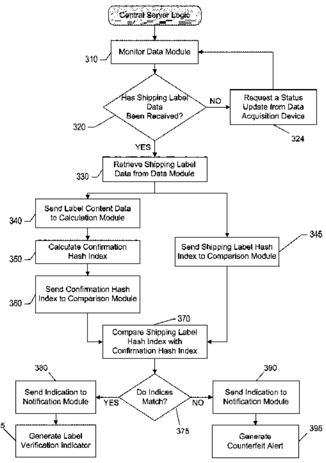
(57) **ABSTRACT**

According to various embodiments, a shipping label validation system is provided for determining whether a shipping label is valid or counterfeit. The system may be used, for example, by a shipping entity (e.g., a common carrier) to prevent counterfeiting by generating and embedding onto the shipping label a shipping label hash index based upon at least a portion of the data located on the shipping label. The shipping label data may include, for example, a sender's address, recipient's address, package weight, tracking number, routing code, service code, and/or MaxiCode. The system may also be used to detect existing counterfeit shipping labels by independently generating a confirmation hash index based upon the same portion of the data used to calculate the shipping label hash index. In various embodiments, the system identifies counterfeit shipping labels based upon any discrepancies revealed when comparing the shipping label hash index to the confirmation hash index.

17 Claims, 9 Drawing Sheets


Central Server Logic
Monitor Data Module
310
Has Shipping Label Data Been Received?
320
NO
Request a Status Update from Data Acquisition Device
324
YES
Retrieve Shipping Label Data from Data Module
330
Send Label Content Data to Calculation Module
340
Calculate Confirmation Hash Index
350
Send Confirmation Hash Index to Comparison Module
360
Send Shipping Label Hash Index to Comparison Module
345
Compare Shipping Label Hash Index with Confirmation Hash Index
370
Do Indices Match?
375
YES
NO
Send Indication to Notification Module
380
Generate Label Verification Indicator
385
Send Indication to Notification Module
390
Generate Counterfeit Alert
395

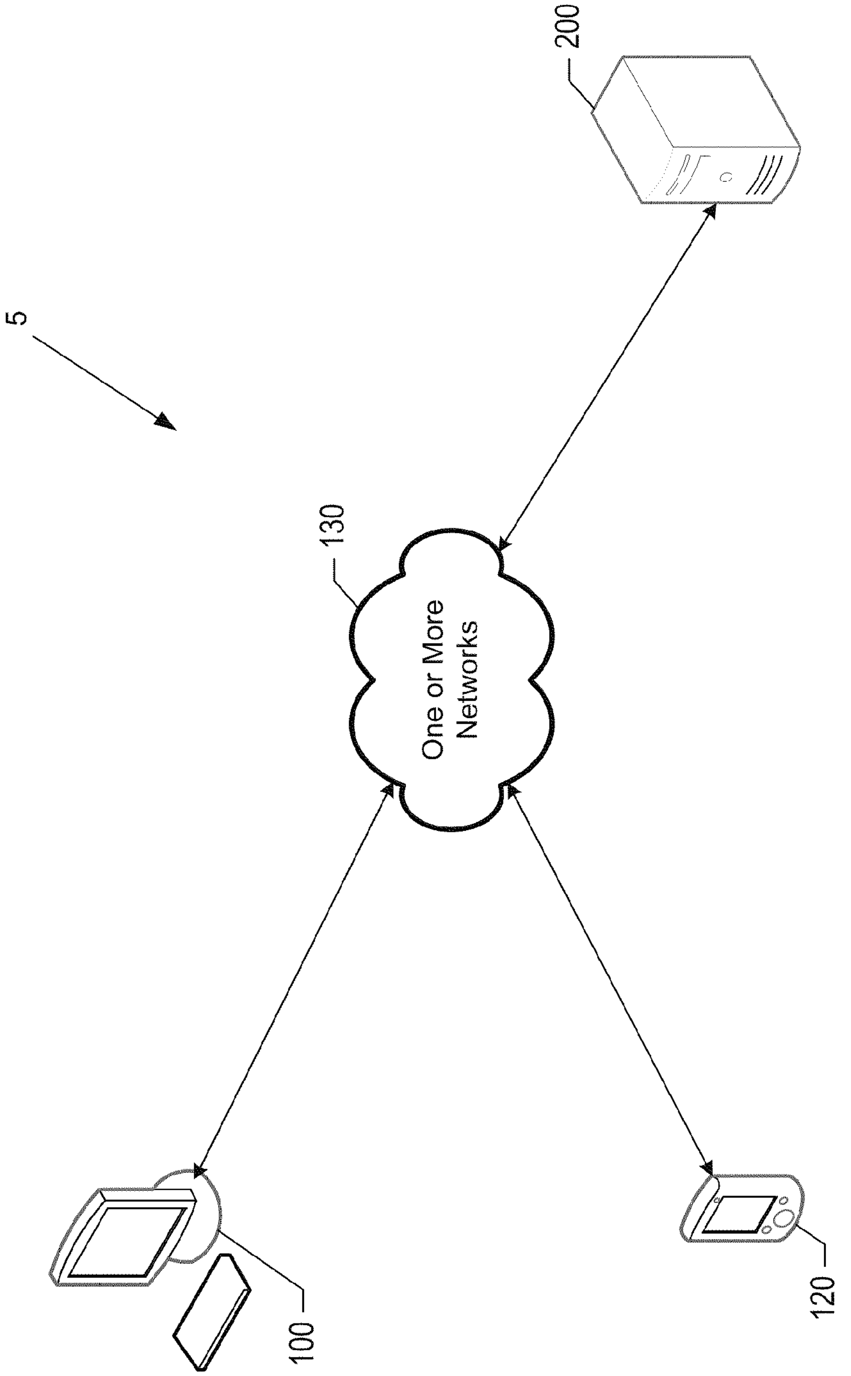


FIG. 1

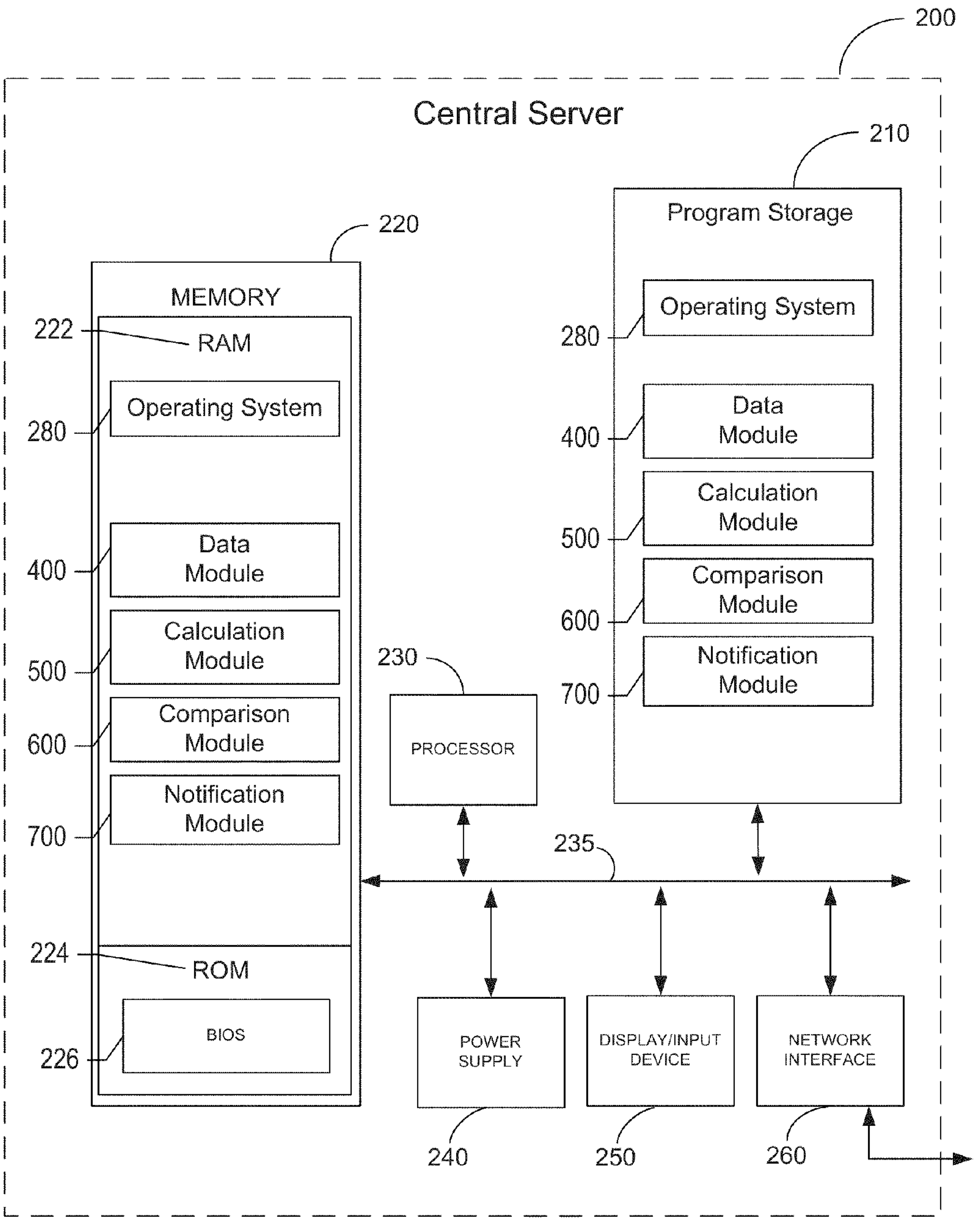

200
Central Server
210
Program Storage
220
MEMORY
222
RAM
Operating System
280
Data Module
400
Calculation Module
500
Comparison Module
600
Notification Module
700
230
PROCESSOR
235
224
ROM
226
BIOS
POWER SUPPLY
DISPLAY/INPUT DEVICE
NETWORK INTERFACE
240
250
260

FIG. 2

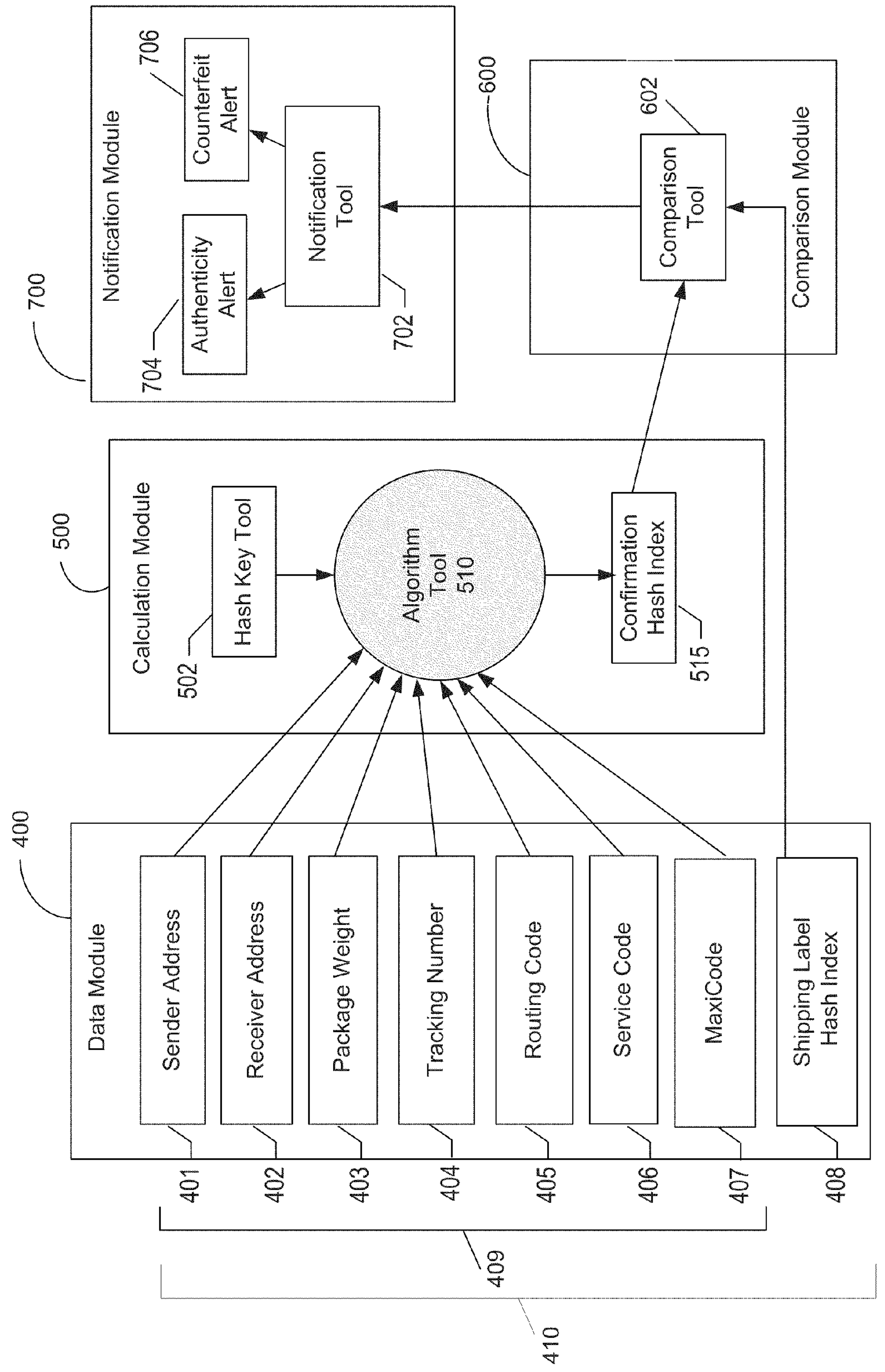
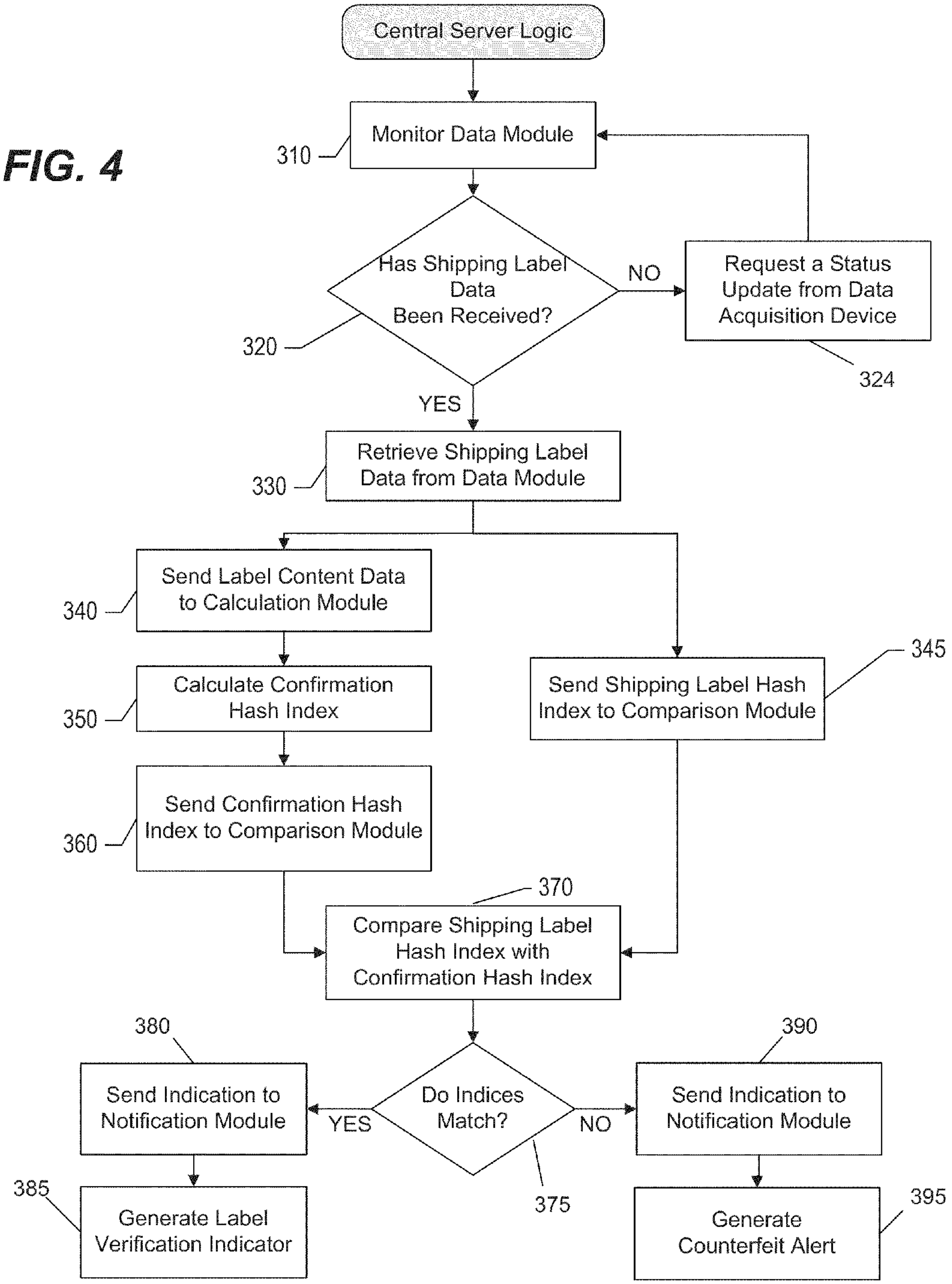

400
Data Module
Sender Address
Receiver Address
Package Weight
Tracking Number
Routing Code
Service Code
MaxiCode
Shipping Label Hash Index
401
402
403
404
405
406
407
408
409
410
500
Calculation Module
Hash Key Tool
502
Algorithm Tool 510
Confirmation Hash Index
515
600
Comparison Module
Comparison Tool
602
700
Notification Module
Notification Tool
702
Authenticity Alert
704
Counterfeit Alert
706

FIG. 3

FIG. 4


Central Server Logic
Monitor Data Module
310
Has Shipping Label Data Been Received?
320
NO
Request a Status Update from Data Acquisition Device
324
YES
Retrieve Shipping Label Data from Data Module
330
Send Label Content Data to Calculation Module
340
Calculate Confirmation Hash Index
350
Send Confirmation Hash Index to Comparison Module
360
Send Shipping Label Hash Index to Comparison Module
345
370
Compare Shipping Label Hash Index with Confirmation Hash Index
380
Send Indication to Notification Module
YES
Do Indices Match?
NO
390
Send Indication to Notification Module
375
385
Generate Label Verification Indicator
Generate Counterfeit Alert
395

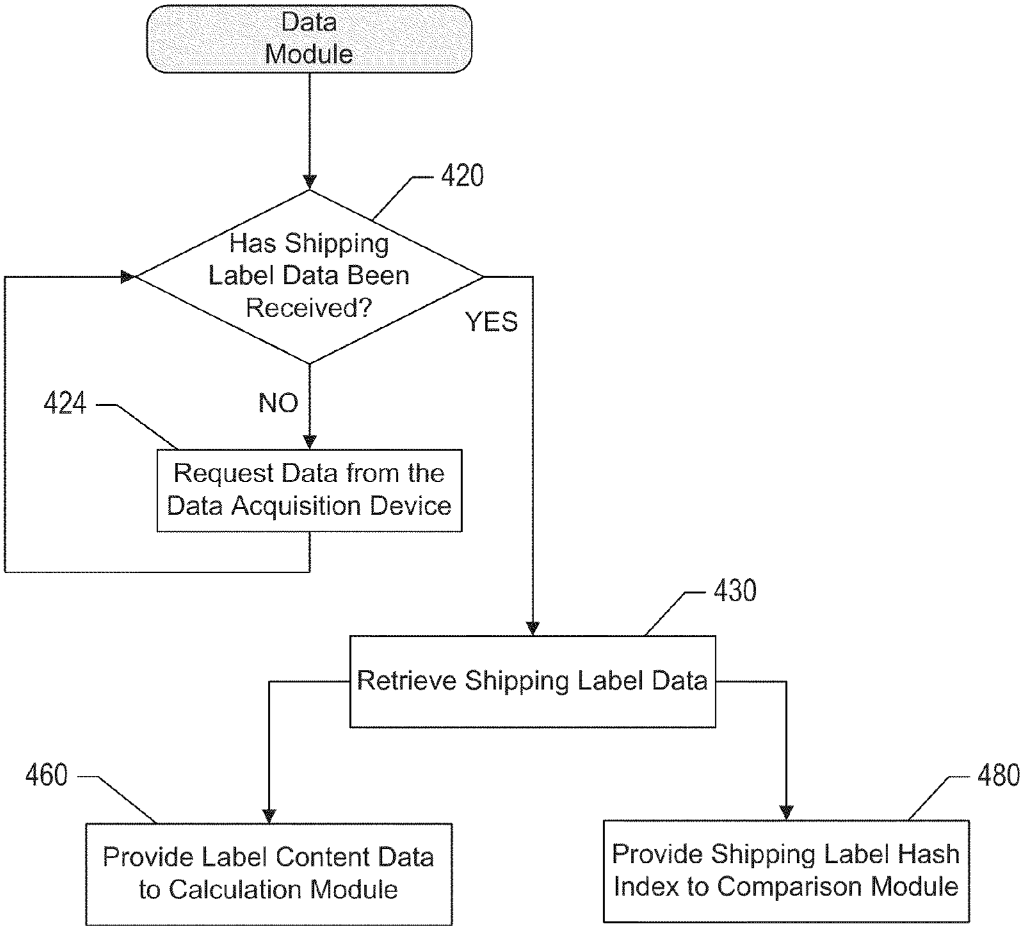

Data
Module
420
Has Shipping
Label Data Been
Received?
YES
424
NO
Request Data from the
Data Acquisition Device
430
Retrieve Shipping Label Data
460
Provide Label Content Data
to Calculation Module
480
Provide Shipping Label Hash
Index to Comparison Module

FIG. 5

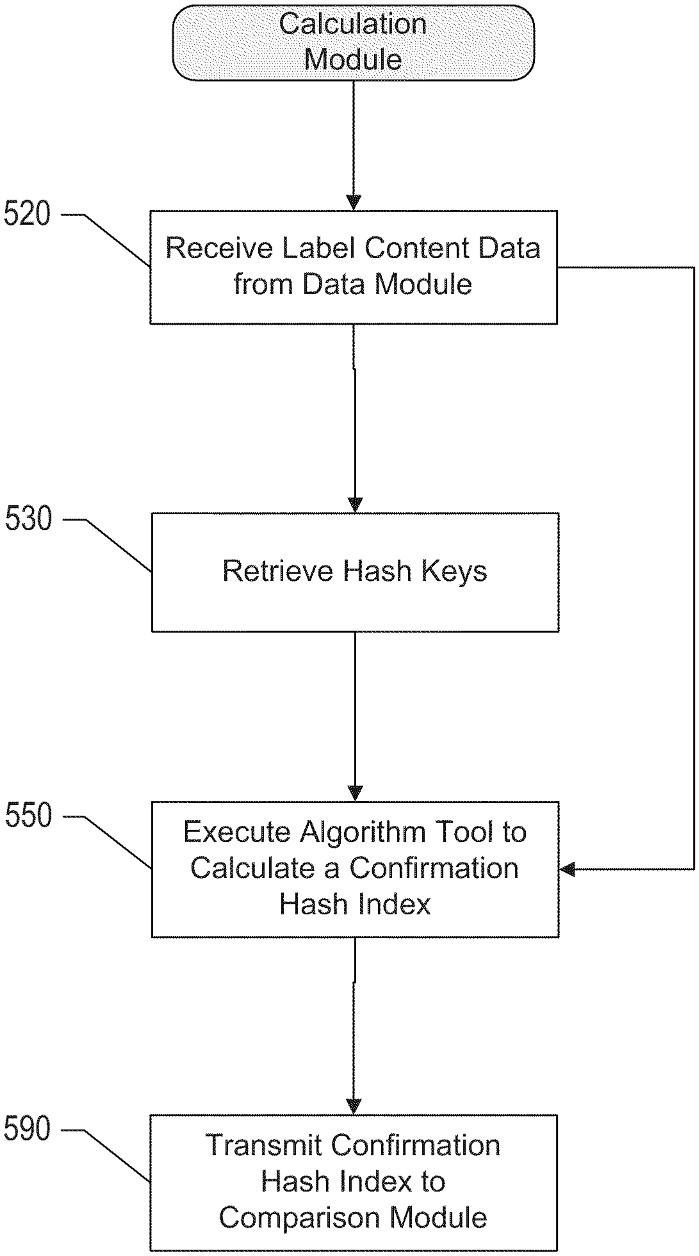

Calculation Module
520
Receive Label Content Data from Data Module
530
Retrieve Hash Keys
550
Execute Algorithm Tool to Calculate a Confirmation Hash Index
590
Transmit Confirmation Hash Index to Comparison Module

FIG. 6

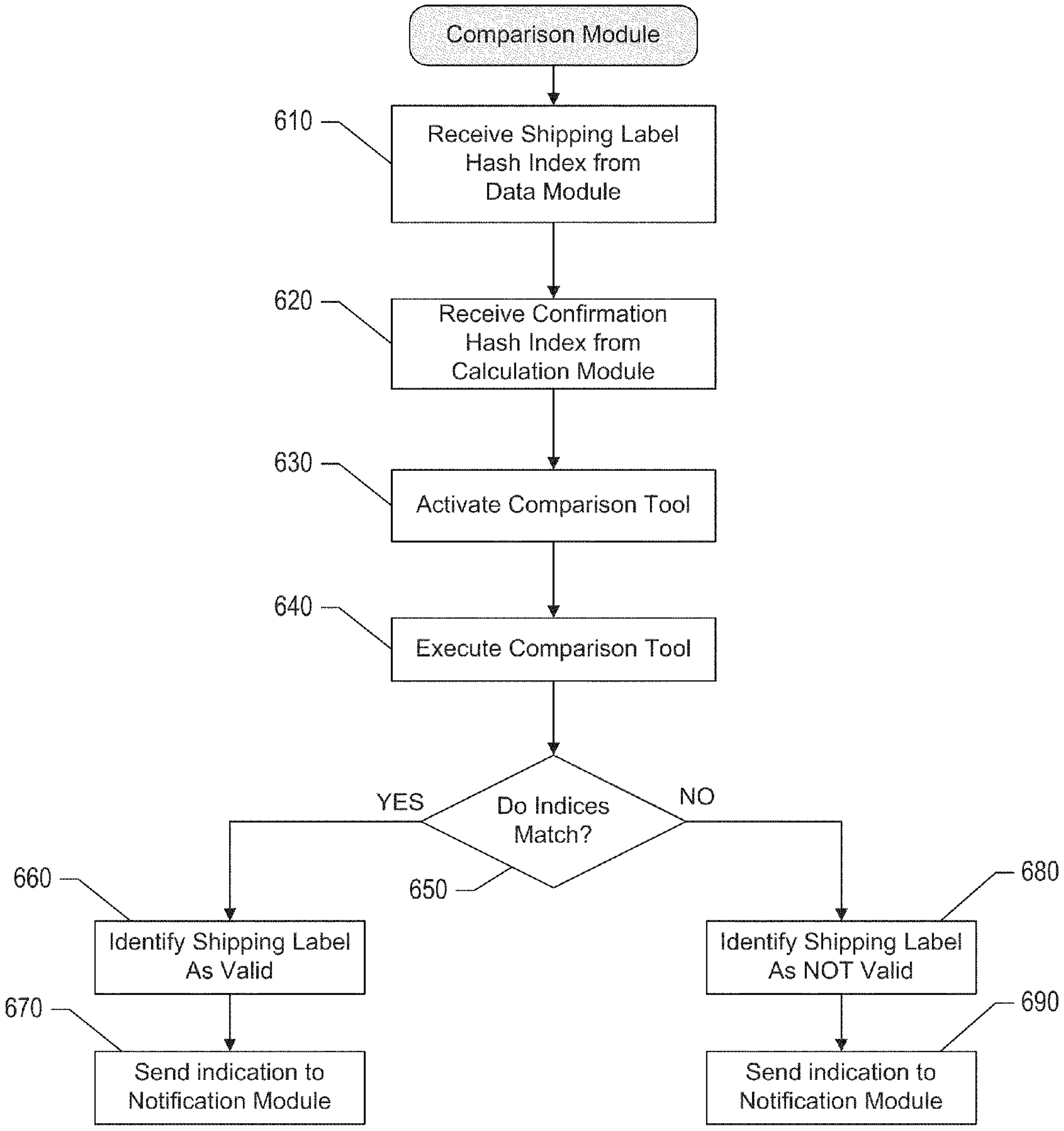

Comparison Module
610
Receive Shipping Label Hash Index from Data Module
620
Receive Confirmation Hash Index from Calculation Module
630
Activate Comparison Tool
640
Execute Comparison Tool
Do Indices Match?
650
YES
NO
660
Identify Shipping Label As Valid
670
Send indication to Notification Module
680
Identify Shipping Label As NOT Valid
690
Send indication to Notification Module

FIG. 7

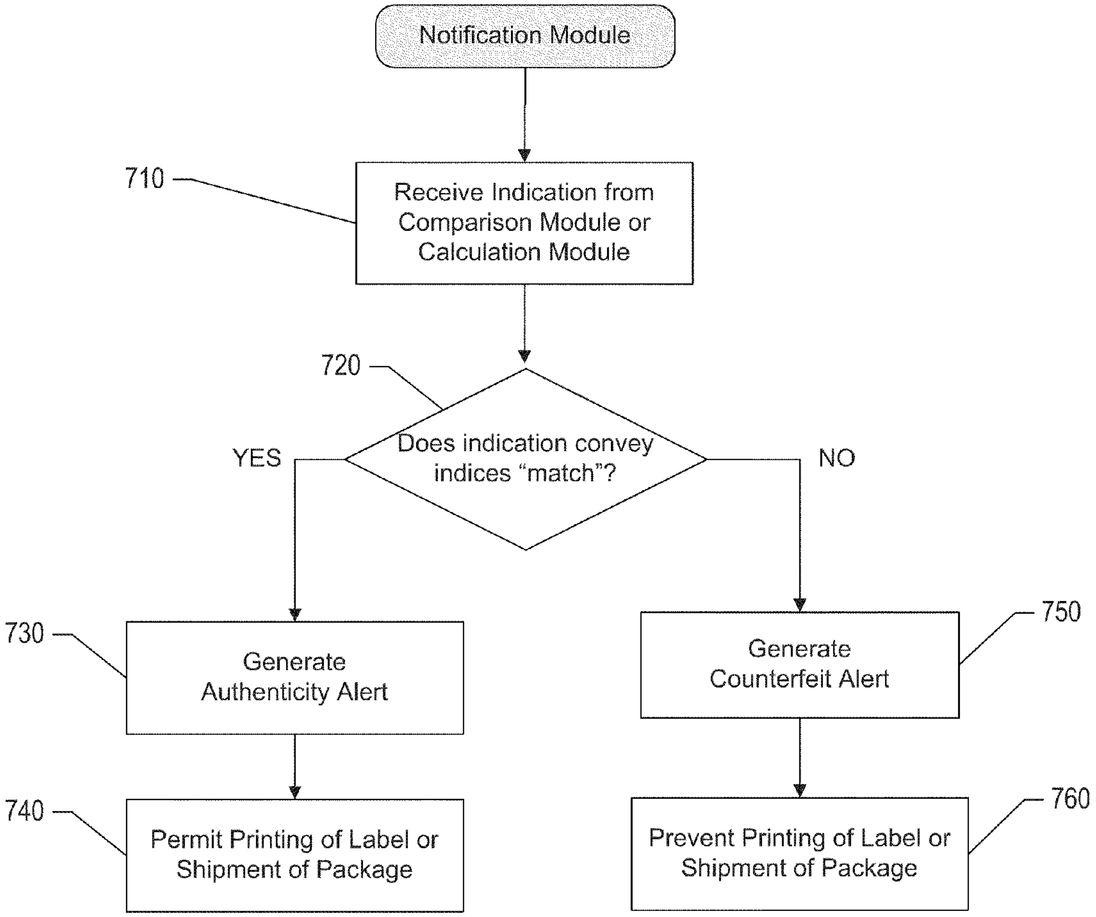

Notification Module
710
Receive Indication from Comparison Module or Calculation Module
720
Does indication convey indices "match"?
YES
NO
730
Generate Authenticity Alert
740
Permit Printing of Label or Shipment of Package
750
Generate Counterfeit Alert
760
Prevent Printing of Label or Shipment of Package

FIG. 8

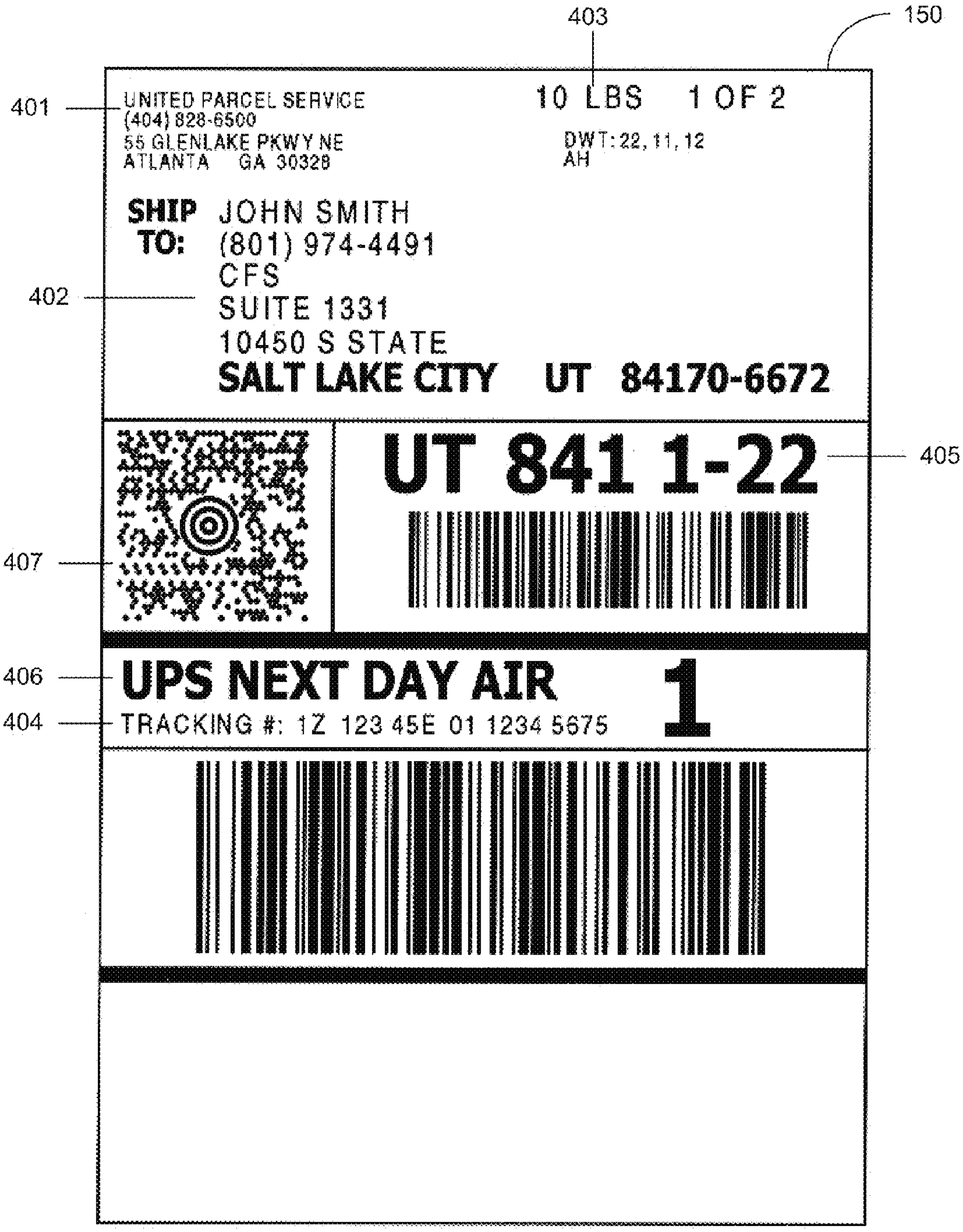

403
150
401
UNITED PARCEL SERVICE
(404) 828-6500
55 GLENLAKE PKWY NE
ATLANTA GA 30328
10 LBS 1 OF 2
DWT: 22, 11, 12
AH
SHIP TO:
JOHN SMITH
(801) 974-4491
CFS
402
SUITE 1331
10450 S STATE
SALT LAKE CITY UT 84170-6672
UT 841 1-22
405
407
406
UPS NEXT DAY AIR
1
404
TRACKING #: 1Z 123 45E 01 1234 5675

FIG. 9

SYSTEMS AND METHODS FOR A SECURE SHIPPING LABEL

BACKGROUND OF THE INVENTION

Shipping carriers (e.g., common carriers, such as United Parcel Service, Inc. (UPS), FedEx, United States Postal Service (USPS), etc.), transport packages to and from a variety of clients for different purposes. Generally, the shipping carriers route, track, and identify such packages with shipping labels that contains pertinent information such as a recipient address, a tracking number, and/or a routing code. Upon affixing the shipping labels to the packages, subsequent transport of the packages is governed largely by the information contained on the shipping labels. Unfortunately, the shipping labels rarely convey whether payment has indeed been received. To shipping carriers, whose revenue depends on payments received to transport the packages, verification that shipping labels are valid (e.g., that payment has indeed been received) remains important. In the past, efforts have focused on the use of physical identifiers (e.g., micro printing, taggants, encryption, e-signature, general machine-readable codes, etc.) to deter or detect counterfeit shipping labels. Such physical identifiers often introduce minor inaccuracies into the shipping label and/or may be hacked easily by those in the counterfeiting business. With access to counterfeit shipping labels, shippers could potentially ship packages without having to submit payment for transport costs, which in turn hurts the shipping carriers' revenue stream. Thus, a need exists to provide systems and methods to effectively deter and detect counterfeit shipping labels prior to the execution of the package shipping process.

BRIEF SUMMARY OF THE INVENTION

According to various embodiments of the present invention, a shipping label validation system is provided for comparing two independently calculated hash indices associated with a shipping label to determine whether the shipping label is valid or counterfeit. Various embodiments of the shipping label validation system include one or more memory storage areas and one or more computer processors, wherein the shipping label validation system is configured for: (i) receiving a shipping label hash index that has been obtained by reading the shipping label hash index from a shipping label; (ii) receiving hash index verification information that has been obtained by reading the hash index verification information from the shipping label; (iii) using the hash index verification information to calculate a confirmation hash index; and (iv) using the shipping label hash index and the confirmation hash index to determine whether the shipping label is a valid shipping label.

According to other embodiments of the present invention, a computer program product is provided for capturing, storing, and analyzing data associated with a shipping label to determine whether the shipping label is valid or counterfeit. Various embodiments of the computer program product include at least one computer-readable storage medium having computer-readable program code portions embodied therein, the computer-readable program code portions comprising: (i) a first executable portion configured for receiving data associated with a shipping label, wherein the data comprises label content data and an embedded hash index; (ii) a second executable portion configured for calculating a confirmation hash index, the confirmation hash index being based upon and derived from the label content data; and (iii) a third executable portion configured for using the confirmation hash index and the embedded hash index to determine whether the shipping label is a valid shipping label.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. **1** is a block diagram of a shipping label validation system according to various embodiments;

FIG. **2** is a schematic block diagram of a shipping carrier server according to various embodiments;

FIG. **3** is a schematic block diagram of the data module, the calculation module, the comparison module, and the notification module shown in FIG. **2** according to various embodiments;

FIG. **4** is a flow diagram of steps executed by the central server shown in FIG. **2** according to various embodiments;

FIG. **5** is a flow diagram of steps executed by the data module shown in FIG. **2** according to various embodiments;

FIG. **6** is a flow diagram of steps executed by the calculation module shown in FIG. **2** according to various embodiments;

FIG. **7** is a flow diagram of steps executed by the comparison module shown in FIG. **2** according to various embodiments

FIG. **8** is a flow diagram of steps executed by the notification module shown in FIG. **2** according to various embodiments; and

FIG. **9** is a shipping label according to one embodiment.

DETAILED DESCRIPTION OF THE INVENTION

Various embodiments of the present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, embodiments of the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. The term "or" is used herein in both the alternative and conjunctive sense, unless otherwise indicated. Like numbers refer to like elements throughout.

Methods, Apparatus, Systems, and Computer Program Products

As should be appreciated, various embodiments may be implemented in various ways, including as methods, apparatus, systems, or computer program products. Accordingly, the embodiments may take the form of an entirely hardware embodiment or an embodiment in which a processor is programmed to perform certain steps. Furthermore, various implementations may take the form of a computer program product on a computer-readable storage medium having computer-readable program instructions embodied in the storage medium. Any suitable computer-readable storage medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

Various embodiments are described below with reference to block diagrams and flowchart illustrations of methods, apparatus, systems, and computer program products. It should be understood that each block of the block diagrams and flowchart illustrations, respectively, may be implemented in part by computer program instructions, e.g., as logical steps or operations executing on a processor in a computing system. These computer program instructions may be loaded onto a computer, such as a special purpose computer or other programmable data processing apparatus to produce a specifically-configured machine, such that the instructions which execute on the computer or other programmable data processing apparatus implement the functions specified in the flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including computer-readable instructions for implementing the functionality specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer-implemented process such that the instructions that execute on the computer or other programmable apparatus provide operations for implementing the functions specified in the flowchart block or blocks.

Accordingly, blocks of the block diagrams and flowchart illustrations support various combinations for performing the specified functions, combinations of operations for performing the specified functions and program instructions for performing the specified functions. It should also be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, could be implemented by special purpose hardware-based computer systems that perform the specified functions or operations, or combinations of special purpose hardware and computer instructions.

General Overview

In general, according to various embodiments of the present invention, methods, apparatus, systems, and computer program products are provided for determining whether a shipping label is valid or counterfeit. This may include capturing, storing, and analyzing content data associated with a shipping label such as, for example, a sender's address, a recipient's address, a package weight, a tracking number, a routing code, a service code, and a machine-readable symbol. To combat counterfeiting measures, in various embodiments, a shipping label hash index is generated by a cryptographic hash function that uses at least a portion of the label content data associated with the shipping label to generate the index as a single identifier for the label content data. The shipping label hash index may be embedded within the shipping label, for example, within the machine-readable symbol. To detect counterfeiting attempts, in various embodiments, a confirmation hash index is independently generated by a cryptographic hash function that operates substantially the same as the cryptographic hash function initially used to create the shipping label hash index. In certain embodiments, hash key values are input together with the label content data to generate the confirmation hash index. In various embodiments, counterfeit shipping labels are identified by comparing the shipping label hash index to the confirmation hash index. In certain embodiments, any discrepancies between the two indices indicate that the shipping label is counterfeit (i.e. not valid). This process can be performed at a variety of locations and timeframes prior to shipping a package to which the shipping label is affixed to (a) combat efforts to counterfeit shipping labels and (b) detect counterfeit shipping labels presently in use.

System Architecture

FIG. **1** provides an illustration of one type of a shipping label validation system **5** that can be used in conjunction with various embodiments of the present invention. In the illustrated embodiment, the system **5** may include one or more networks **130**, a data acquisition device **120**, a central server **200**, and a remote terminal **100**. While FIG. **1** illustrates the various system entities as separate, standalone entities, the various embodiments are not limited to this particular architecture.

According to various embodiments of the present invention, the one or more networks **130** may be capable of supporting communication in accordance with any one or more of a number of second-generation (2G), 2.5G, third-generation (3G), and/or fourth-generation (4G) mobile communication protocols, or the like. More particularly, the one or more networks **130** may be capable of supporting communication in accordance with 2G wireless communication protocols IS-136 (TDMA), GSM, and IS-95 (CDMA). Also, for example, the one or more networks **130** may be capable of supporting communication in accordance with 2.5G wireless communication protocols GPRS, Enhanced Data GSM Environment (EDGE), or the like. In addition, for example, the one or more networks **130** may be capable of supporting communication in accordance with 3G wireless communication protocols such as Universal Mobile Telephone System (UMTS) network employing Wideband Code Division Multiple Access (WCDMA) radio access technology. Some narrow-band AMPS (NAMPS), as well as TACS, network(s) may also benefit from embodiments of the present invention, as should dual or higher mode mobile stations (e.g., digital/analog or TDMA/CDMA/analog phones). As yet another example, each of the components of the system **5** may be configured to communicate with one another in accordance with techniques such as, for example, radio frequency (RF), Bluetooth™, infrared (IrDA), or any of a number of different wired or wireless networking techniques, including a wired or wireless Personal Area Network ("PAN"), Local Area Network ("LAN"), Metropolitan Area Network ("MAN"), Wide Area Network ("WAN"), or the like.

Although the data acquisition device **120**, the central server **200**, and the remote terminal **100** are illustrated in FIG. **1** as communicating with one another over the same one or more networks **130**, these devices may likewise communicate over multiple, separate networks. For example, while the data acquisition device **120** may communicate with the central server **200** over a wireless personal area network (WPAN) using, for example, Bluetooth techniques, the remote terminal **100** may communicate with the central server **200** over a wireless wide area network (WWAN), for example, in accordance with EDGE, or some other 2.5G wireless communication protocol.

According to one embodiment, in addition to receiving data from the remote terminal **100** and/or the central server **200**, the data acquisition device **120** may be further configured to collect and transmit data on its own. For example, according to one embodiment, the data acquisition device **120** may include a camera and/or scanner for providing label content data in the form of, for example, tracking number and routing code values. In particular embodiments, and as is discussed in more detail below, this camera and/or scanner may be used to gather information regarding a shipping label, which may, in turn, be used to determine whether the shipping label is valid or counterfeit.

The data acquisition device **120** may be any device associated with a carrier (e.g., a common carrier, such as UPS, FedEx, USPS, etc.). In various embodiments, the data acquisition device **120** may be capable of receiving data via one or more input units or devices, such as a keypad, touchpad, barcode scanner, radio frequency identification (RFID) reader, interface card (e.g., modem, etc.) or receiver. The data acquisition device **120** may further be capable of storing data to one or more volatile or non-volatile memory modules, and outputting the data via one or more output units or devices, for example, by displaying data to the user operating the device, or by transmitting data, for example over the one or more networks **130**. In certain embodiments, the data acquisition device **120** may also be capable of calculating and comparing the confirmation hash index **515**, as described in further detail below. One type of data acquisition device **120**, which may be used in conjunction with embodiments of the present invention is the Delivery Information Acquisition Device (DIAD) presently utilized by UPS.

The remote terminal **100**, in various embodiments, may be any device capable of receiving data via one or more input units or devices, such as a keypad, touchpad, barcode scanner, RFID, interface card (e.g., modem, etc.), or receiver. The remote terminal **100** may further be capable of storing data to one or more volatile or non-volatile memory modules, and outputting the data via one or more output units or devices, for example, by displaying data to the user operating the terminal **100**, or by transmitting data, for example, over the network **130**. In certain embodiments, the remote terminal **100** is associated with the carrier at a location remote from the central server **200**. In other embodiments, the remote terminal **100** is associated with a client or customer, also at a location remote from the central server **200**.

Central Server Architecture

In various embodiments, the central server **200** includes various systems for performing one or more functions in accordance with embodiments of the present invention, including those more particularly shown and described herein. It should be understood, however, that the central server **200** might include a variety of alternative devices for performing one or more like functions, without departing from the spirit and scope of the present invention. For example, at least a portion of the central server **200**, in certain embodiments, may be located on the data acquisition device **120** or the remote terminal **100**.

FIG. **2** is a schematic diagram of the central server **200** according to various embodiments. The central server **200** includes a processor **230** that communicates with other elements within the server via a system interface or bus **235**. Also included in the central server **200** is a display/input device **250** for receiving and displaying data. This display/input device **250** may be, for example, a keyboard or pointing device that is used in combination with a monitor. The central server **200** further includes memory **220**, which preferably includes both read only memory (ROM) **224** and random access memory (RAM) **222**. The server's ROM **224** is used to store a basic input/output system **226** (BIOS), containing the basic routines that help to transfer information between elements within the central server **200**.

In addition, the central server **200** includes one or more storage devices **210**, such as a hard disk drive, a floppy disk drive, a CD Rom drive, or optical disk drive, for storing information on various computer-readable media, such as a hard disk, a removable magnetic disk, or a CD-ROM disk. As will be appreciated by one of ordinary skill in the art, each of these storage devices **210** are connected to the system bus **235** by an appropriate interface. The storage devices **210** and their associated computer-readable media provide nonvolatile storage for the central server. As will be appreciated by one of ordinary skill in the art, the computer-readable media described above could be replaced by any other type of computer-readable media known in the art. Such media include,

for example, magnetic cassettes, flash memory cards, digital video disks, and Bernoulli cartridges.

Also located within the central server **200** is a network interface **260** for interfacing and communicating with other elements of the one or more networks **130**. It will be appreciated by one of ordinary skill in the art that one or more of the central server **200** components may be located geographically remotely from other central server **200** components. Furthermore, one or more of the central server **200** components may be combined, and/or additional components performing functions described herein may also be included in the central server **200**.

While the foregoing describes a single processor **230**, as one of ordinary skill in the art will recognize, the central server **200** may comprise multiple processors operating in conjunction with one another to perform the functionality described herein. In addition to the memory **220**, the processor **230** can also be connected to at least one interface or other devices capable of displaying, transmitting and/or receiving data, content or the like. In this regard, the interface(s) can include at least one communication interface or other devices for transmitting and/or receiving data, content or the like, as well as one or more user interface that can include a display and/or a user input interface. The user input interface, in turn, can comprise any of a number of devices allowing the entity to receive data from a user, such as a keypad, a touch display, a joystick or other input device.

While reference is made to a central "server" **200**, as one of ordinary skill in the art will recognize, embodiments of the present invention are not limited to a client-server architecture. The system of embodiments of the present invention is further not limited to a single server, or similar network entity or mainframe computer system. Other similar architectures including one or more network entities operating in conjunction with one another to provide the functionality described herein may likewise be used without departing from the spirit and scope of embodiments of the present invention. For example, a mesh network of two or more personal computers (PCs), similar electronic devices, or handheld portable devices, collaborating with one another to provide the functionality described herein in association with the central server **200** may likewise be used without departing from the spirit and scope of embodiments of the present invention.

As illustrated in FIG. **2**, a number of program modules may also be located within the central server **200**. The program modules may be stored by the various storage devices **210** and within RAM **222**. Such program modules include an operating system **280**, a data module **400**, a calculation module **500**, a comparison module **600**, and a notification module **700**. According to various embodiments, these modules **400**, **500**, **600**, and **700**, control certain aspects of the operation of the central server **200** with the assistance of the processor **230** and operating system **280**.

FIG. **3** is a schematic block diagram of how the various modules stored by the various storage devices **210** of the central server **200** interact with one another. In various embodiments, the data module **400** is configured to receive and store label content data **409** associated with a shipping label **150** (not shown). As will be discussed in further detail below, the label content data **409** may include, for example, a sender address **401**, a receiver address **402**, a package weight **403**, a tracking number **404**, a routing code **405**, a service code **406**, and a machine-readable symbol **407** such as, for example, a MaxiCode, a PDF**417** code, a Micro PDF**417** code, a QR code, or any comparable symbol as generally known and used in the art. In certain embodiments, the data module **400** is also configured to receive and store a shipping label hash index **408**. The label content data may include any combination of these data and/or other data. In the illustrated embodiment, the label content data **409** and the shipping label hash index **408**, when combined, comprise the entirety of shipping label data **410**.

In various embodiments, the data module **400** is configured to provide the label content data **409** to the calculation module **500** and to provide the shipping label hash index **408** to the comparison module **600**. In certain embodiments, the calculation module **500** is configured to activate an algorithm tool **510** that, in turn, calculates a confirmation hash index **515** based upon at least a portion of the label content data **409**. As will be discussed in further detail below, in a particular embodiment, the algorithm tool **510** is activated by a hash key tool **502**. In certain embodiments, the calculation module **500** is further configured to provide the confirmation hash index **515** to the comparison module **600**.

In various embodiments, the comparison module **600** is configured to receive and compare the confirmation hash index **515** and the shipping label hash index **408**, and to identify any discrepancies between the two indices. In certain embodiments, the comparison module **600** transmits its findings to the notification module **700** for further processing. In particular embodiments, the notification module **700** is configured to execute a notification tool **702** that generates either an authenticity alert **704** or a counterfeit alert **704**, depending on the indication received from the comparison module **600**. In various embodiments, the notification tool **702** generates the authenticity alert **704** in response to the comparison module **600** finding no discrepancies, and generates the counterfeit alert **706** in response to the comparison module **600** finding one or more discrepancies.

In a particular embodiment, these program modules **400**, **500**, **600**, **700**, and **800**, are executed by the central server **200** and are configured to generate graphical user interfaces accessible to users of the system **5**. In one embodiment, the user interfaces may be accessible via one or more networks **130**, which may include the Internet or other suitable communications network, as previously discussed. In other embodiments, one or more of the modules **400**, **500**, **600**, **700**, and **800** may be stored locally on one or more remote terminals **100** and/or data acquisition devices **120**, and may be executed by one or more processors of the terminals **100** and/or devices **120**. According to various embodiments, the modules **400**, **500**, **600**, and **700** may send data to, receive data from, and utilize data contained in, a database, which may be comprised of one or more separate, linked and/or networked databases.

Central Server Logic

FIG. **4** illustrates steps that may be executed by the central server **200** to analyze label content data **409** captured by and received from the data acquisition device **120** and/or the remote terminal **100**, calculate a confirmation hash index **515** based on at least a portion of the label content data **409**, identify any discrepancies between the confirmation hash index **515** and the shipping label hash index **408**, and generate an appropriate alert depending on the identified discrepancies. In various embodiments, the steps illustrated in FIG. **4** may also be executed by the data acquisition device **120** without any assistance from the central server **200**.

Beginning with step **310**, the central server **200**, according to various embodiments, periodically monitors the data module **400** to assess whether any data associated with a shipping label (e.g., shipping label data **410**, as shown in FIG. **3**) has been received from the data acquisition device **120**. In certain embodiments, the shipping label data **410** may include various pieces of information located on a shipping label **150**. The shipping label data **410**, according to various embodiments, may include, for example, a sender address **401**, a receiver address **402**, a package weight **403**, a tracking number **404**, a routing code **405**, a service code **406**, a machine-readable symbol **407**, and a shipping label hash index **408**. The machine-readable symbol, in various embodiments, may be a MaxiCode, a PDF**417** code, a Micro PDF**417** code, a QR code, or any comparable symbol as generally known and used in the art. For purposes of illustration, the MaxiCode is a public domain, machine-readable symbol that resembles a barcode, but use dots arranged in a hexagonal grid instead of bars. MaxiCodes can be helpful in tracking and managing the shipment of packages. In the embodiment illustrated in FIG. **9**, the shipping label hash index **408** is embedded within the machine-readable symbol **407**, though in other embodiments, the index may be embedded elsewhere on the shipping label **150**.

Returning to FIG. **4**, if, during step **320**, the central server **200** determines that no shipping label data **410** has been received, the central server proceeds to step **324**, in which the central server requests a status update from the data acquisition device **120**. In various embodiments, once the shipping label data **410** has been requested, the central server **200** returns to steps **310** and **320** to reassess whether any data has been received at the data module **400**. In one embodiment, when back at step **320** for a second time, if shipping label data **410** still does not arrive, the central server **200** will passively await receipt of the data. In another embodiment, when back at step **320** for a second or subsequent time, if shipping label data **410** still does not arrive, the central server **200** will continually loop back through step **324** until shipping label data is received. In other embodiments (not shown), the central server **200** may contact a remote terminal **100** instead of and/or in addition to the data acquisition device **120**. In still further embodiments, the central server logic is triggered by a message received from a data acquisition device or the data module.

If, during step **320**, the central server **200** determines that shipping label data **410** has been received at the data module **400**, the server proceeds to step **330** and retrieves the data from the module. The central server **200** then proceeds to step **340**, during which the server contacts the calculation module **500** in preparation for calculating a confirmation hash index **515** (see FIG. **3**). In step **350**, the server instructs the calculation module **500** to calculate the confirmation hash index **515**. In various embodiments, calculation of the confirmation hash index **515** involves the execution of an algorithm tool **510**, as shown in FIG. **3**. In various embodiments, the algorithm tool **510** is fully executed in response to label content data **410** being transmitted to the calculation module **500** by the central server **200**. In other embodiments, the algorithm tool **510** requires a hash key tool **505** to retrieve and input one or more hash key values into the algorithm tool **510** to fully execute the algorithm tool. In those embodiments, as will be discussed in more detail below, the algorithm tool **510** cannot be fully executed without the hash key values.

In certain embodiments, as will also be discussed in more detail below, the algorithm tool **510** executes a cryptographic hash function that inputs various portions of elements within the label content data **409** and outputs them as a single identifier (e.g., the confirmation hash index **515**). In various embodiments, the portion of the label content data used to generate the confirmation hash index may be referred to generally as hash index verification information. In various embodiments, the cryptographic hash function may be any of a variety of such functions as commonly known and available. In a particular embodiment, the cryptographic hash function is a Secure-Hash-Algorithm-**2** (SHA-**2**). In another embodiment, the cryptographic hash function is any one of a number of comparable algorithms capable of creating a 10-byte or greater hash index.

Returning to FIG. **4**, in various embodiments, once the confirmation hash index **515** is calculated, the central server **200** proceeds to step **360** and instructs the calculation module **500** to send the index to the comparison module **600**. As will be discussed in further detail later, in certain embodiments, the central server **200** also instructs the calculation module **500** to send the shipping label hash index **408** to the comparison module **600**. In other embodiments, the central server **200** instructs the comparison module **600** to periodically scan for and retrieve the two indices from the calculation module **500** and the data module **400**. In still other embodiments, the data and calculation modules **400**, **500** may automatically transmit the two hash indices to the comparison module **600** once they are either received or calculated.

In various embodiments, during step **370**, the central server **200** instructs the comparison module **600** to compare the shipping label hash index **408** obtained from the shipping label **150** itself with the newly calculated confirmation hash index **515**. In certain embodiments, this comparison involves execution of a comparison tool **602**, as illustrated in FIG. **3**. In various embodiments, the comparison tool **602** may comprise a value comparison utility, or any comparable utility, as are commonly known and available, that is capable of identifying discrepancies between values within the indices.

Once the hash indices have been compared, the central server proceeds to step **375**, querying whether the indices match. If any discrepancies exist (e.g., the indices do not "match"), the central server **200**, according to various embodiments, executes steps **390** and **395**, sending an indication to the notification module **700** and instructing the module to generate a counterfeit alert. In various embodiments, the counterfeit alert identifies the shipping label **150** as being invalid. In various embodiments, if no discrepancies are identified (e.g., the indices do "match"), the central server **200** executes steps **380** and **385**, sending an indication to the notification module **700** and instructing the module to generate an authenticity alert. In various embodiments, the authenticity alert identifies the shipping label **150** as being valid.

Data Module Logic

According to various embodiments, the data module **400** is configured to receive and store label content data **409** and a shipping label hash index **408** associated with a shipping label **150**. In certain embodiments, the data module **400** is configured to provide the label content data **409** to the calculation module **500** and to provide the shipping label hash index **408** to the comparison module **600**. FIG. **5** illustrates steps that may be executed by the data module **400** according to various embodiments. Beginning with step **420**, the data module **400** assesses whether data associated with a shipping label **150** (e.g., shipping label data **410** as shown in FIG. **4**) has been received by the module. In certain embodiments, the data module **400** makes this assessment by periodically scanning one or more databases associated with the module and identifying shipping label data **150** within the databases that was not present during a previous periodic scan under step **420**. In various embodiments, if new shipping label data **410** has been received, the data module **400** proceeds to step **430**.

In various embodiments, the shipping label data **410** retrieved in step **430** includes a variety of information associated with a shipping label **150**. As illustrated in FIG. **9**, the shipping label **150** may include one or more addresses, for example, a sender address **401** and a recipient address **402**. In certain embodiments, the shipping label **150** further includes a weight **403** of a package associated with the shipping label **150**. In one embodiment, the shipping label **150** includes a tracking number **404**, a routing code **405**, and a service code **406**. In other embodiments, the shipping label **150** includes various combinations of the shipping label data **410**, such as, for example, a routing code **405**, a sender address **401**, a package weight **403**, and a machine-readable symbol **407**, such as, for example, a MaxiCode, a PDF**417** code, a Micro PDF**417** code, a QR code, or any comparable symbol as generally known and used in the art. In various embodiments, each of these pieces of information enable shipping carriers (e.g., common carriers, such as United Parcel Service, Inc. (UPS), FedEx, United States Postal Service (USPS), etc.) to receive, transport, and monitor various aspects of the package shipping process.

In various embodiments, the shipping label data **410** retrieved in step **430** includes a shipping label hash index **408**. According to various embodiments, the shipping label hash index **408** is initially created using a cryptographic hash function substantially the same as the cryptographic hash function executed by the algorithm tool **510** to calculate the confirmation hash index **515** (see FIG. **3**). In various embodiments, the cryptographic hash function inputs various portions of elements within the label content data **409** and outputs them as a single identifier (e.g., the confirmation hash index **515**). For example, in certain embodiments, portions of the recipient address **402**, the package weight **403**, and the tracking number **404** are inputs to the hash function. In other embodiments, portions of the routing code **405**, service code **406**, and/or the sender address **401** comprise the necessary function inputs. In other embodiments, portions of one or more hash key values selected by a hash key tool **505** (see FIG. **3**) serve as an input to the cryptographic hash function alongside the various portions of elements within the label content data **409**. In various embodiments, the cryptographic hash function may be any of a variety of such functions as commonly known and available. In a particular embodiment, the cryptographic hash function is a Secure-Hash-Algorithm-**2** (SHA-**2**). In another embodiment, the cryptographic hash function is any one of a number of comparable algorithms capable of creating a 10-byte or greater hash index.

In various embodiments, the shipping label data **410** retrieved in step **430** further includes a machine-readable symbol **407**, such as, for example, a MaxiCode, a PDF**417** code, a Micro PDF**417** code, a QR code, or any comparable symbol as generally known and used in the art. The MaxiCode, for purposes of illustration is a public domain, machine-readable symbol that resembles a barcode, but uses dots arranged in a hexagonal grid instead of bars. In certain embodiments, the MaxiCode assists shipping carriers with tracking and managing the shipment of packages. In various embodiments, a variety of information may be embedded into the machine-readable symbol **407**. In the embodiment illustrated in FIG. **9**, the shipping label hash index **408** is embedded within the machine-readable symbol **407**. In other embodiments, the shipping label hash index **408** may be embedded elsewhere on the shipping label **150**.

If, in various embodiments, no new shipping label data **410** has been received by the data module **400**, the module proceeds, in step **424** to request data from the data acquisition device **120**. In various embodiments, the data module **400** remains in a loop process, repeatedly querying the data acquisition device **120** until shipping label data **410** is received. In other embodiments, the data module **400** passively awaits receipt of shipping label data **410** after executing steps **424** and **420** a single time. In one embodiment (not shown), the data module **400** may query a remote terminal **100** regarding shipping label data **410** instead of and/or in addition to querying the data acquisition device **120**.

Once the data module retrieves the shipping label data **410** in step **430**, the module proceeds to steps **460** and **480**. In various embodiments, during step **460**, the data module **400** provides at least a portion of the label content data **409** to the calculation module **500**. As will be discussed in further detail below, the calculation module **500** uses the provided label content data **409**, which may also be referred to generally as hash index verification information, to derive a confirmation hash index **515**. In various embodiments, during step **480**, the data module **400** provides the shipping label hash index **408** to the comparison module **600**. As will be discussed in further detail below in relation to FIG. **7**, the comparison module **600** uses the shipping label hash index **408** to identify any discrepancies between that index and the confirmation hash index **515**.

Calculation Module Logic

According to various embodiments, the calculation module **500** is configured to execute an algorithm tool **510** to calculate a confirmation hash index **515** based upon at least a portion of the data associated with the shipping label. In various embodiments, the algorithm tool **510** is fully executed based upon label content data **409** received from the data module **400**. In other embodiments, the algorithm tool **510** requires a hash key tool **505** to retrieve and input one or more hash key values into the algorithm tool **510**. In those embodiments, the confirmation hash index **515** is calculated based upon the hash key values and the label content data **409**. In other words, the algorithm tool **510** cannot be fully executed without first receiving and/or retrieving the proper hash key values. In various embodiments involving the hash key tool **505**, the hash key values are changed periodically to protect against brute force hacking of the algorithm tool **510**. In certain embodiments, the hash key values are randomly generated periodically. In other embodiments, a user (e.g., one with administrative privileges) generates new hash key values at a pre-established interval. In one embodiment, the pre-established interval is every six months.

FIG. **6** illustrates steps that may be executed by the calculation module **500** according to various embodiments. Beginning with step **520**, the calculation module **500** receives at least a portion of the shipping label data **410** from the data module **400**. In various embodiments, the portion of the label content data used to generate the confirmation hash index may be referred to generally as hash index verification information. In certain embodiments, the calculation module **500** requests the data from the data module **400**, while in other embodiments, the data module **400** transmits the data automatically without request from the calculation module **500**. Once the shipping label data **410** has been received by the calculation module **500**, the module, in certain embodiments proceeds to step **550**, wherein the algorithm tool **510** is executed. In other embodiments, once the shipping label data **410** has been received, the calculation module **500** proceeds to retrieve one or more hash keys in step **530**, which are in turn used, in part, to generate the confirmation hash index **515** during the execution of the algorithm tool **510** in step **550**.

In those embodiments wherein the calculation module **500** proceeds to step **530**, a hash key tool **502** retrieves one or more hash key values from a host module (not shown). The hash key values, in various embodiments, comprise a sequence of numerical and/or American Standard Code for Information Interchange (ASCII) data. In certain embodiments, the hash key values serve as an input, in combination with various portions of elements within the label content data **409**, used to calculate the confirmation hash index **515**.

In various embodiments, including both those involving the hash key tool **502** and hash key values and those without, the calculation module **500** proceeds to step **550**. During step **550**, in various embodiments, the module calculates the confirmation hash index **515**. According to various embodiments, the confirmation hash index **515** is calculated by using a cryptographic hash function substantially the same as the cryptographic hash function initially executed to create the shipping label hash index **408**. In various embodiments, the cryptographic hash function inputs various portions of elements within the label content data **409** and outputs them as a single identifier (e.g., the confirmation hash index **515**). In certain embodiments, the cryptographic hash function inputs the hash key values retrieved by the hash key tool **502** in combination with the various portions of elements within the label content data **409** and outputs the combined data as the confirmation hash index **515**. In any event, the two cryptographic hash functions, in various embodiments, always utilize the same portions of elements within the label content data **409** (and, where applicable, the hash key values) as inputs to the function. In various embodiments, the cryptographic hash function may be any of a variety of such functions as commonly known and available. In a particular embodiment, the cryptographic hash function is a Secure-Hash-Algorithm-**2** (SHA-**2**). In another embodiment, the cryptographic hash function is any one of a number of comparable algorithms capable of creating a 10-byte or greater hash index.

In various embodiments, the confirmation hash index **515** computed by the tool is based on at least a portion of a sender address **401**, a tracking number **404**, and a machine-readable symbol **407**, such as, for example, a MaxiCode, a PDF**417** code, a Micro PDF**417** code, a QR code, or any comparable symbol as generally known and used in the art. In other embodiments, the confirmation hash index **515** is based further on at least a portion of a receiver address **402**, a package weight **403**, a routing code **405**, and a service code **406**. FIG. **9** illustrates a possible label wherein for certain embodiments the confirmation hash index **515** may be derived from at least a portion of a street name within the sender address **401**, at least a portion of a zip code within the receiver address **402**, at least a portion of a third sequence of numbers within the tracking number **404**, and/or at least some portion of data retrieved from the machine-readable symbol **407**. In other embodiments, the confirmation hash index **515** may be derived from any combination of elements or portions of elements found within the shipping label data **410** as further illustrated in FIG. **9**. In any of these embodiments, the algorithm tool **510** (in conjunction with the hash key tool **502**, if applicable) defines the combination of elements upon which the confirmation hash index **515** is based. In various embodiments, the portion or combination of the elements used to compute the confirmation hash index might be referred to generally as hash index verification information.

In certain embodiments, the combination of elements from the label content data **409** that are used to compute the confirmation hash index **515** (and the shipping label hash index **408**) are arranged in a three-dimensional array or cube. After the array or cube is created, the algorithm tool **510** parses the data within the array or cube (in combination with the hash key values retrieved by the hash key tool **515**, where applicable), to create a data bit stream. The algorithm tool **510** then, accordingly to various embodiments, applies a plurality of iterations to the data bit stream, such that each iteration uses at least a portion of the data stream and the hash key values to generate the confirmation hash index **515**. In certain embodiments, the iterations applied to the data bit stream are based upon a unique set of instructions stored on the central server **200**. In various embodiments, the unique set of instructions is periodically updated to prevent brute force hacking of the algorithm tool **510**.

In various embodiments, after calculating the confirmation hash index **515** in step **550**, the calculation module **500** proceeds to step **590**. In certain embodiments, during step **590**, the module transmits the confirmation hash index **515** to the comparison module **600**. In other embodiments, during step **590**, the calculation module **500** passively makes the confirmation hash index **515** available to the comparison module **600** and provides the index upon request from the latter.

Comparison Module Logic

According to various embodiments, the comparison module **600** is configured to compare the confirmation hash index **515** and the shipping label hash index **408** to identify any discrepancies between the two indices. In various embodiments, the comparison module **600** includes a comparison tool **602**. FIG. **7** illustrates steps that may be executed by the comparison module **600** according to various embodiments. Beginning with step **610**, in various embodiments, the comparison module **600** receives the shipping label hash index **408** from the data module **400**. In certain embodiments, the shipping label hash index **408** is automatically provided to the comparison module **600** by the data module **400**. In other embodiments, the comparison module **600** must query the data module **400** for transmittal of the index. In still other embodiments, the comparison module **600** receives (either automatically or in response to a query) the shipping label hash index **408** from the calculation module **500** as opposed to from the data module **400**. In various embodiments, once the shipping label hash index **408** has been received, the comparison module **600** proceeds to step **620**, wherein the module receives the confirmation hash index **515** from the calculation module **500**. In certain embodiments, the confirmation hash index **515** is automatically provided to the comparison module **600** by the calculation module **500**. In other embodiments, the comparison module **600** must query the calculation module **500** for transmittal of the index.

In various embodiments, the comparison module **600** includes a comparison tool **602**. In certain embodiments, the comparison tool **602** is executed in step **640** to determine whether the two indices (**408** and **515**) match one another. In one embodiment, the comparison tool **602** executes a value comparison utility on the two indices to determine whether each character within one of the indices correlates with the corresponding character within the other of the indices. In other embodiments, a variety of comparable value and/or file comparison utilities, as are commonly known and available, may be used to identify any discrepancies between the two indices. In still other embodiments, the comparison tool **602** may prompt a visual assessment of the two indices by a system operator as at least a portion of the comparison process.

If, during step **650**, no discrepancies are identified between the shipping label hash index **408** and the confirmation hash index **515**, the comparison module **600**, according to various embodiments, proceeds to step **660**. During step **660**, the comparison module **600** identifies the shipping label **150** as being a valid shipping label. In certain embodiments, the comparison module **600** then proceeds to step **670**, during which the comparison module **600** notifies the notification module **700** that the shipping label **150** is valid. In other embodiments, the comparison module **600** passively provides its determination that the shipping label **150** is valid to the notification module **700** only when requested.

If, during step **650**, one or more discrepancies are identified between the shipping label hash index **408** and the confirmation hash index **515**, the comparison module **600**, according to various embodiments, proceeds to step **680**. During step **680**, the comparison module **600** identifies the shipping label **150** as not being a valid shipping label (i.e., as being a counterfeit label). In certain embodiments, the comparison module then proceeds to step **690**, during which the comparison module **600** notifies the notification module **700** that the shipping label **150** is invalid. In other embodiments, the comparison module **600** passively provides its determination that the shipping label **150** is invalid to the notification module **700** only when requested.

Notification Module Logic

According to various embodiments, the notification module **700** is configured to generate a counterfeit alert **706** that classifies the shipping label **150** as being a counterfeit label in response to the comparison module **600** finding discrepancies between the shipping label hash index **408** and the subsequently calculated confirmation hash index **515**. In certain embodiments, the notification module **700** is also configured to generate the counterfeit alert **706** in response to the calculation module **500** identifying one or more hash keys as invalid. In various embodiments, the notification module **700** is configured to generate an authenticity alert **704** that classifies the shipping label **150** as being a valid label in response to the comparison module **600** finding no discrepancies between the shipping label hash index **408** and the subsequently calculated confirmation hash index **515**.

FIG. **8** illustrates steps that may be executed by the notification module **700** according to various embodiments. Beginning with step **710**, according to various embodiments, the notification module **700** receives an indication from the comparison module **600** or the calculation module **500**. During step **720**, the notification module **700** assesses whether the indication identifies a discrepancy or a match between the hash indices **408**, **515** or the hash keys. If no discrepancies are identified, the notification module **700** proceeds to step **730**, during which the module generates the authenticity alert **704**. In certain embodiments, the label authenticity alert **704** causes the system **5** to authorize further transport of the package associated with the shipping label **150** by a shipping carrier. In a particular embodiment, the authenticity alert **704** is an audible indicator while in another embodiment, the alert is a visual indicator. In even further embodiments, the authenticity alert **704** is a combination of audible, visual, and/or any combination of indications as commonly known and understood in the art.

In various embodiments, during step **740**, the authenticity alert **704** causes the system **5** to authorize and/or permit a user of the system **5** to print the shipping label **150**. In various embodiments, the user may choose to print the shipping label **150** via the display/input device **250** of the system **5** (see FIG. **2**). In certain embodiments, the printed shipping label **150** may be subject to additional verification by the system **5**, such as for example, when a package associated with the shipping label **150** is received by the shipping carrier. In those embodiments, the calculation **500** and comparison **600** modules may again verify the validity of the shipping label **150** prior to authorizing further transport of the package.

Alternatively, if, during step **720**, one or more discrepancies are identified, the notification module **700** proceeds to step **750**, during which the module generates the counterfeit alert **706**. In certain embodiments, the counterfeit alert **706** causes the system **5** to prevent further transport of the package associated with the shipping label **150** by a shipping carrier. In particular embodiments, the counterfeit alert **706** is an audible indicator while in other embodiments, the indicator is a visual indicator. In even further embodiments, the counterfeit alert **706** is a combination of audible, visual, and/or any combination of indications as commonly known and understood in the art.

In various embodiments, during step **760**, the counterfeit alert **706** causes the system to prohibit and/or prevent a user of the system **5** from printing the shipping label **150**. In certain of these embodiments, the system **5** notifies the user, via the display/input device **250**, that the shipping label **150** has been identified as counterfeit. For example, in certain embodiment, the counterfeit alert **706** comprises a routing indicator that affects subsequent routing and/or transport of a package associated with the shipping label **150**. In a particular embodiment, the routing indicator flags the package as undeliverable. In other embodiments, the routing indicator diverts the package for further inspection by the shipping carrier.

Conclusion

Many modifications and other embodiments of the invention set forth herein will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed:

1. A shipping label validation system comprising:

one or more memory storage areas; and

one or more computer processors that are configured to receive data stored in the one or more memory storage areas, wherein the one or more computer processors are configured for:

(A) receiving a shipping label hash index that has been obtained by reading the shipping label hash index from a shipping label;

(B) receiving un-encoded hash index verification information that has been obtained by capturing the un-encoded hash index verification information from the shipping label, the un-encoded hash index verification information comprising a combination of address data and non-address data and being received separately from the shipping label hash index of (A);

(C) using the un-encoded hash index verification information to calculate a confirmation hash index, said calculating being performed without reference to the shipping label hash index and including:

i. retrieving at least one hash key value from the one or more memory storage areas;

ii. determining whether the retrieved at least one hash key value is valid;

iii. inputting the at least one hash key value into a calculation tool, activation of said calculation tool being dependent, at least in part, upon inputting of a valid hash key value; and

iv. calculating the confirmation hash index based on the at least one hash key value and the un-encoded hash index verification information; and

(D) determining whether the shipping label is a valid shipping label, said determination including:

i. determining whether the retrieved at least one hash key value is valid;

ii. comparing the shipping label hash index with the confirmation hash index;

iii. in response to the shipping label hash index and the confirmation hash index being the same and the hash key value being valid, determining that the shipping label is a valid shipping label; and

iv. in response to at least one of the shipping label hash index and the confirmation hash index not being the same or the hash key value being invalid, determining that the shipping label is not a valid shipping label.

2. The shipping label validation system of claim **1**, wherein:

the shipping label validation system further comprises one or more bar code scanners; and

the shipping label hash index and the un-encoded hash index verification information have been obtained by scanning the shipping label with the one or more bar code scanners.

3. The shipping label validation system of claim **1**, wherein:

the shipping label validation system further comprises a camera; and

the shipping label hash index and the un-encoded hash index verification information have been obtained by:

(A) using the camera to take an image of the shipping label, and

(B) retrieving the shipping label hash index and the hash index verification information from the image.

4. The shipping label validation system of claim **1**, wherein the un-encoded hash index verification information comprises at least one label identifier.

5. The shipping label validation system of claim **4**, wherein the at least one label identifier comprises at least one of a sender address, a recipient address, or a package weight printed on the shipping label.

6. The shipping label validation system of claim **5**, wherein the at least one label identifier further comprises at least one of a tracking number, a routing code, or a service code printed on the shipping label.

7. The shipping label validation system of claim **1**, wherein the calculation tool comprises a Secure-Hash-Algorithm (SHA-2).

8. The shipping label validation system of claim **1**, wherein:

in response to determining that the shipping label is not a valid shipping label, the one or more computer processors are further configured for generating a counterfeit alert.

9. The shipping label validation system of claim **8**, wherein the counterfeit alert indicates that the shipping label is not valid.

10. The shipping label validation system of claim **8**, wherein the counterfeit alert comprises at least one alert indicator that is selected from a group consisting of:

an audible indicator, a visual indicator, and a routing indicator.

11. The shipping label validation system of claim **10**, wherein the at least one alert indicator is a routing indicator, wherein the routing indicator flags a package associated with the shipping label as undeliverable.

12. The shipping label validation system of claim **1**, wherein the step (D) further comprises:

in response to determining that the shipping label is a valid shipping label, generating an authenticity alert; and

in response to determining that the shipping label is not a valid shipping label, generating a counterfeit alert.

13. The shipping label validation system of claim **12**, wherein the shipping label validation system is configured to allow a customer to print the shipping label in response to generating the authenticity alert.

14. The shipping label validation system of claim **12**, wherein the shipping label validation system is configured to prevent a customer from printing the shipping label in response to generating the counterfeit alert.

15. A non-transitory computer program product comprising at least one computer-readable storage medium having computer-readable program code portions embodied therein, the computer-readable program code portions comprising:

a first executable portion configured for receiving data associated with a shipping label, wherein the data comprises un-encoded label content data and an embedded hash index, the un-encoded label content data comprising a combination of address data and non-address data;

a second executable portion configured for calculating a confirmation hash index, the confirmation hash index being based upon and derived from the un-encoded label content data without reference to the embedded hash index and including retrieving at least one hash key value, determining whether the retrieved at least one hash key value is valid, inputting the at least one hash key value into a calculation tool, activation of said calculation tool being dependent at least in part, upon inputting of a valid hash key value, and calculating the confirmation hash index based on the at least one hash key value and the un-encoded label content data; and

a third executable portion configured for determining whether the shipping label is a valid shipping label, said determination including determining whether the retrieved at least one hash key value is valid, comparing the embedded hash index with the confirmation hash index, in response to the embedded hash index and the confirmation hash index being the same and the hash key value being valid, determining that the shipping label is a valid shipping label, and in response to at least one of the embedded hash index and the confirmation hash index not being the same or the hash key value being invalid, determining that the shipping label is not a valid shipping label.

16. The non-transitory computer program product of claim **15**, wherein the third executable portion is further configured for:

in response to determining that the shipping label is a valid shipping label, generating an authenticity alert; and

in response to determining that the shipping label is not a valid shipping label, generating a counterfeit alert.

17. The non-transitory computer program product of claim **16**, wherein the non-transitory computer program product is configured for:

in response to the third executable portion generating the authenticity alert, allowing a customer to print the shipping label; and

in response to the third executable portion generating the counterfeit alert, preventing a customer from printing the shipping label.

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